

What is claimed is;

1. A digital camera comprising:

an image-capturing device that captures a subject image;

5 an exposure control device that implements control on a length of exposure time to elapse while capturing the subject image at said image-capturing device;

an image generating device that generates a plurality of sets of image data through successive image-capturing operations performed over varying exposure times by
10 controlling said image-capturing device and said exposure control device; and

an image processing device that generates image data in which the blur has been corrected by implementing image
15 processing based upon the plurality of sets of image data generated by said image generating device.

2. A digital camera according to claim 1, wherein:

said image generating device successively generates
20 first image data by capturing an image over a first exposure time and second image data by capturing an image over a second exposure time set longer than the first exposure time; and

said image processing device generates third image data in which the blur has been corrected by correcting at least
25 a high-frequency component of a spatial frequency contained

in the second image data based upon the first image data and the second image data generated by said image generating device.

5 3. A digital camera according to claim 2, wherein:

said exposure control device implements control so that the second exposure time is set to a length of time over which a correct exposure quantity that sets brightness of the image data to a correct level is achieved and so that the first exposure time is set equal to or less than approximately 1/2 of the second exposure time.

4. A digital camera according to claim 2, further comprising:

15 an image compression device that compresses the first image data at a first compression rate and compresses the second image data at a second compression rate higher than the first compression rate; and

a recording device that records the first image data and the second image data having been compressed at said image compression device.

5. A digital camera according to claim 2, further comprising:

25 a display control device that allows the second image

data to be displayed at a display unit and disallows display of the first image data at the display unit.

6. A digital camera according to claim 2, wherein:

5 said image processing device generates the third image data by correcting an amplitude and a phase of a spatial frequency component of the second image data based upon an amplitude ratio and a phase difference of the spatial frequency component of the first image data and the spatial
10 frequency component of the second image data.

7. A digital camera according to claim 2, wherein:

15 said image processing device divides both the first image data and the second image data into pixel data blocks each containing pixel data corresponding to a predetermined number of pixels, calculates an amplitude ratio and a phase difference of a spatial frequency component of the first image data and the spatial frequency component of the second image data in each pixel data block for each frequency, calculates
20 an average amplitude ratio and an average phase difference of the spatial frequency components of the first image data and the second image data by averaging amplitude ratios and phase differences of the spatial frequency components in individual pixel data blocks that have been calculated and
25 generates the third image data by correcting the amplitude

and the phase of the spatial frequency component of the second image data based upon the average amplitude ratio and the average phase difference thus calculated.

5 8. A digital camera according to claim 2, wherein:

10 said image processing device implements gradation correction processing on the third image data if the third image data that have been generated contain brightness data indicating a value equal to or higher than a predetermined value.

9. A digital camera according to claim 2, wherein:

15 said image processing device implements processing the third image data to increase a quantifying bit number thereof if the third image data having been quantized at a predetermined quantifying bit number contain brightness data indicating a value equal to or higher than a predetermined value.

20 10. A digital camera according to claim 1, further comprising:

25 a flash control device that controls a flash light emitting unit to illuminate a subject at light emission quantities in proportion to varying exposure times when generating a plurality of sets of image data over the varying

exposure times at said image generating device.

11. A digital camera according to claim 1, further comprising:

5 a blur detection device that detects a blur manifesting in image data based upon a plurality of sets of image data generated at said image generating device, wherein:

4003445-02702
said image processing device records one set of image data among said plurality of sets of image data into a
10 recording medium without implementing image processing for blur correction if the detection results obtained at said blur detection device indicate that none of the plurality of sets of image data manifest a blur, and executes image processing for blur correction if a blur has occurred in one of the
15 plurality of sets of image data and records image data obtained by correcting the blur into the recording medium.

12. A digital camera according to claim 2, further comprising:

20 a blur detection device that detects a blur manifesting in the second image data based upon the first image data and the second image data generated at said image generating device, wherein:

said image processing device records the second image
25 data into a recording medium without implementing image

processing for blur correction if the detection results
obtained at said blur detection device indicate that the
second image data do not manifest any blur, and executes image
processing for blur correction if a blur has manifested in
5 the second image data and records third image data obtained
by correcting the blur into the recording medium.

13. A digital camera according to claim 2, further
comprising:

10 a panning direction setting unit through which a panning
direction along which the second image data are captured is
set, wherein:

said image processing device changes details of image
processing implemented to generate the third image data in
15 correspondence to the panning direction set at said panning
direction setting unit.

14. A digital camera according to claim 13, wherein:

said image processing device generates the third image
20 data primarily by correcting a spatial frequency component
along a vertical direction contained in the second image data
if horizontal panning is set at said panning direction setting
unit, and generates the third image data primarily by
correcting a spatial frequency component along the horizontal
25 direction contained in the second image data if vertical

panning is set at said panning direction setting unit.

15. A digital camera according to claim 2, further comprising:

5 a panning direction detection unit that detects a panning direction along which the second image data are captured, wherein:

said image processing device changes details of image processing implemented to generate the third image data in
10 correspondence to the panning direction detected by said panning direction detection unit.

16. A digital camera according to claim 15, wherein:

said image processing device generates the third image
15 data primarily by correcting a spatial frequency component along a vertical direction contained in the second image data if horizontal panning is detected by said panning direction detection unit, and generates the third image data primarily by correcting a spatial frequency component along a
20 horizontal direction contained in the second image data if vertical panning is detected at said panning direction detection unit.

17. A digital camera according to claim 12, wherein:

25 said exposure control device implements control so that

the second exposure time is set to a length of time over which
a correct exposure quantity that sets brightness of the image
data to a correct level is achieved and so that the first
exposure time is set equal to or less than approximately 1/2
5 of the second exposure time.

18. A digital camera according to claim 13, wherein:
said exposure control device implements control so that
the second exposure time is set to a length of time over which
10 a correct exposure quantity that sets brightness of the image
data to a correct level is achieved and so that the first
exposure time is set equal to or less than approximately 1/2
of the second exposure time.

19. A digital camera according to claim 15, wherein:
said exposure control device implements control on ?
so that the second exposure time is set to a length of time
over which a correct exposure quantity that sets brightness
of the image data to a correct level is achieved and so that
20 the first exposure time is set equal to or less than
approximately 1/2 of the second exposure time.

20. A digital camera according to claim 1, further
comprising:
25 a detection unit that detects a photographing condition

of said digital camera which manifests a blur in image data generated by said image generating device, wherein:

said image processing device executes image processing for blur correction only when said detection unit detects the
5 photographing condition of said digital camera which manifests a blur in the image data.

21. An image processing system comprising:

10 a digital camera having an image-capturing device that captures a subject image, an exposure control device that controls the length of exposure time to elapse while capturing the subject image at said image-capturing device and an image
15 generating device that engages said exposure control device and said image-capturing device to successively generate first image data by capturing an image over a first exposure
time and second image data by capturing an image over a second exposure time set longer than the first exposure time; and

20 an image processing apparatus that generates third image data by correcting at least a high-frequency component of a spatial frequency contained in the second image data
based upon the first image data and the second image data generated by said digital camera.

22. An image processing system comprising:

25 a digital camera having an image-capturing device that

captures a subject image, an exposure control device that controls the length of exposure time to elapse while capturing the subject image at said image-capturing device and an image generating device that engages said exposure control device and said image-capturing device to successively generate first image data by capturing an image over a first exposure time and second image data by capturing an image over a second exposure time set longer than the first exposure time; and an image processing apparatus that detects a panning direction along which the second image data have been captured and generates third image data by correcting a spatial frequency component contained in the second image data in correspondence to the panning direction based upon the first image data and the second image data generated by said digital camera.

23. A digital camera comprising:
an image-capturing device that captures a subject image;
an exposure control device that implements control on a length of exposure time to elapse while capturing the subject image at said image-capturing device;
an image generating device that successively generates first image data by capturing an image over a first exposure time and second image data by capturing an image over a second

exposure time set longer than the first exposure time;

an image processing device that generates third image data in which a blur is corrected by correcting at least a high-frequency component of a spatial frequency contained in the second image data based upon the first image data and the second image data generated by said image generating device;

an image compression device that compresses the first image data at a first compression rate and compresses the second image data at a second compression rate higher than the first compression rate;

a recording device that records the first image data and the second image data having been compressed at said image compression device into a recording medium; and

a display control device that allows the second image data to be displayed at a display unit and disallows display of the first image data at the display unit, wherein:

said exposure control device implements control so that the second exposure time is set to a length of time over which a correct exposure quantity that sets brightness of the image data to a correct level is achieved and so that the first exposure time is set equal to or less than approximately 1/2 of the second exposure time;

said image processing device divides both the first image data and the second image data into pixel data blocks each containing pixel data corresponding to a predetermined

number of pixels, calculates an amplitude ratio and a phase difference of a spatial frequency component of the first image data and the spatial frequency component of the second image data in each pixel data block, calculates an average amplitude ratio and an average phase difference of the spatial frequency components of the first image data and the second image data by averaging amplitude ratios and phase differences of the spatial frequency components in individual pixel data blocks that have been calculated and generates the third image data by correcting the amplitude and the phase of the spatial frequency component of the second image data based upon the average amplitude ratio and the average phase difference thus calculated.

24. A digital camera comprising:
- an image-capturing device that captures a subject image;
 - an exposure control device that implements control on a length of exposure time to elapse while capturing the subject image at said image-capturing device;
 - an image generating device that successively generates first image data by capturing an image over a first exposure time and second image data by capturing an image over a second exposure time set longer than the first exposure time;
 - an image processing device that generates third image

data in which a blur is corrected by correcting at least a high-frequency component of a spatial frequency contained in the second image data based upon the first image data and the second image data generated by said image generating device;

5 an image compression device that compresses the first image data at a first compression rate and compresses the second image data at a second compression rate higher than the first compression rate;

10 a display control device that allows the second image data to be displayed at a display unit and disallows display of the first image data at the display unit, and

15 a blur detection device that detects the blur manifesting in the second image data based upon the first image data and the second image data generated at said image generating device, wherein:

 said exposure control device implements control so that the second exposure time is set to a length of time over which a correct exposure quantity that sets brightness of the image data to a correct level is achieved and so that the first exposure time is set equal to or less than approximately 1/2 of the second exposure time; and

25 said image processing device records the second image data into a recording medium without implementing image processing for blur correction if detection results obtained at said blur detection device indicate that the second image

data do not manifest any blur, whereas said image processing device divides both the first image data and the second image data into pixel each containing pixel data corresponding to a predetermined number of pixels, calculates an amplitude ratio and a phase difference of the spatial frequency component of the first image data and the spatial frequency component of the second image data in each pixel data block for each frequency, calculates an average amplitude ratio and an average phase difference of the spatial frequency components of the first image data and the second image data by averaging amplitude ratios and phase differences of spatial frequency components in individual pixel data blocks that have been calculated, generates the third image data by correcting the amplitude and the phase of the spatial frequency component of the second image data based upon the average amplitude ratio and the average phase difference thus calculated and records the third image data obtained by correcting the blur into the recording medium.

25. A digital camera according to claim 24, further comprising:

a panning direction detection unit that detects a panning direction along which the second image data are captured, wherein:

said image processing device generates the third image

data primarily by correcting a spatial frequency component along a vertical direction contained in the second image data if horizontal panning is detected by said panning direction detection unit, and generates the third image data primarily

5 by correcting the spatial frequency component along a horizontal direction contained in the second image data if vertical panning is detected by said panning direction detection unit.

40083445.002702